HOOD AND DUCT DESIGN INTENT
VENTILATION CONTROL AND FIRE PROTECTION OF
COMMERCIAL COOKING OPERATIONS
2006 IBC and 2006 IMC Chapter 5
To Accompany Architectural Review

Listed items require revision/clarification by contractual documentation (i.e., revised drawings, specifications, addenda, etc.) before plans can be approved. *Answers in letter form are not acceptable*. The Design Intent must be submitted by a Tennessee registered designer. **Starting construction before plan approval may be considered as just cause, by the State, to issue a stop work order. [Rule 0780-2-3-.02]**

Submittal Requirements

1. Provide two sets of sealed design drawings for the commercial kitchen hood and duct system with preliminary static pressure loss calculations and room ventilation balancing sealed by a Tennessee registered architect or engineer. Show the kitchen layout, location and type of cooking equipment, exhaust and supply duct systems, exhaust and supply air fans, fuel or electrical power supply, automatic fire-extinguishing system and manual pull system activation location, means of egress, prep tables, cabinets, electrical control panels, fire alarm system activation and monitoring, and extra hazard fire extinguisher location. [Rule 0780-2-3-.03 and A&E Rule 0120-2-.03(3)]

Commercial Hood

1. Cooking equipment used in processes producing smoke or grease-laden vapors must be equipped with an exhaust system which includes a commercial hood, grease removal devices, an exhaust duct system, and an automatic fire-extinguishing system. [IMC 507.1 and 507.2.1]

2. A commercial cooking exhaust hood is required for domestic cooking appliances used for commercial purposes. [IMC 507.2.3]

3. Provide a schedule for the cooking exhaust hood, hood manufacturer and model number, hood length and width, cfm ratings, and hood collar static pressure loss.

4. The hood must be listed by a nationally recognized testing laboratory (U.L., ETL, etc.). *Provide the following listing information on plans: on-line U.L. listing card/file and identify specific criteria for the system: model number, minimum exhaust cfm, maximum supply cfm, and maximum cooking surface temperature.* [IMC 507.1]

5. The hood canopy must overhang or extend a horizontal distance of not less than 6 inches beyond the edge of the top horizontal surface of the appliance on all open sides (see Exception). The vertical distance between the front lower lip of the hood and the appliance must not exceed 4 feet. [IMC 507.12]

6. The exhaust hood must be installed with a clearance to combustibles (no wood) of not less than 18 inches (see Exception). [IMC 507.9] Show a scaled full height cross-section of the hood with exhaust and supply duct systems. Show mounting height above finish floor. Include noncombustible hood mounting supports. [IMC 507.6]

7. Show new and existing cooking equipment layout. Identify fuel or electrical power supply for all equipment whether new, existing, or not in contract. Show electric shunt trip and gas solenoid shut off valve. [IBC 904.3]

8. Provide a kitchen area supply and exhaust air balancing schedule verifying that the total outdoor air supplied equals the volume removed. [IMC 403.1] Any negative pressure should not exceed 0.02 inches of water column.

9. The hood exhaust fan must automatically activate whenever cooking operations occur (see Exception No. 3. - IMC 507.1). [IMC 507.2.1.1]

10. Show that the automatic fire-extinguishing system is connected to the building monitored fire alarm system. [IBC 907.13 and 907.14]

Exhaust and Supply Fans

1. Provide a schedule for the cooking hood exhaust and supply fans manufacturer, model numbers, cfm ratings and fan static pressure ratings. The exhaust fan must be listed for greasy atmosphere by a nationally recognized testing laboratory (U.L., etc.). [IMC 506.5.1 Exception]

2. Exhaust outlets:

    A. Exhaust outlets that terminate at the roof must have the discharge opening not less than 40 inches above the roof surface. IMC 506.3.12.1]
    B. Exhaust outlets must be located not less than 10 feet horizontally from parts of the same building, adjacent buildings, adjacent property lines, and intake openings into any building (see Exception for 5 feet clearances), and not less than 10 feet above the adjoining grade level. [IMC 506.3.12.3 and IMC 401.4]
    C. Exhaust outlet may terminate through exterior walls where the discharge does not create a public nuisance or a fire hazard. Other exterior openings must not be located within 3 feet of such terminations. No exhaust outlets are permitted where protected openings are required by the IBC. [IMC 506.3.12.2]

3. Exhaust fans must be positioned so that the discharge does not impinge on the roof, other equipment, or appliance, or parts of the structure. [IMC 506.5.2]

Fire Suppression System

1. An automatic fire-extinguishing system is required for protection of grease removal devices, hood exhaust plenums, and exhaust duct systems. [IMC 509.1] Show suppression nozzles and system piping on the kitchen hood and cooking equipment diagram. Hood fire-extinguishing system must comply with the U.L. 300 performance test. Tilting brazing pan equipment requires special consideration for nozzle suppression system coverage. [IBC 904.1, 904.3, and 904.5]

2. Show the location of the manual pull station for activating the automatic fire-extinguishing system. [IBC 904.3.2] The manual pull station must be located along the means of egress from the cooking area a minimum of 10 feet and a maximum of 20 feet from the kitchen exhaust system. [IBC 904.11.1]

Exhaust Duct System

1. Provide a table of static pressure losses for the elements of the exhaust duct system: collar, straight segments, and any change of direction.

2. Exhaust ducts must be designed and sized to provide a minimum air velocity of 500 feet per minute. [IMC 506.3.4] Identify the largest cross-section area of the duct system and provide calculations demonstrating how it meets 500 fpm.

3. Grease duct systems and exhaust equipment serving a kitchen hood must have a clearance to combustible construction. [IMC 506.3.6] Provide a scaled detail showing the necessary clearances for the exhaust duct system.

    A. Minimum 18 inches clearance to combustible materials (no wood).
    B. Minimum three inches to noncombustible construction and gypsum wallboard attached to noncombustible structures.
    C. Listed and labeled factory-built commercial kitchen grease ducts may be used to reduce clearance requirements.

4. All sections of the exhaust duct system must be constructed and installed so that grease cannot collect in any portion of the duct and must slope not less than ¼ inch per foot (2-percent slope) toward either the hood or an approved grease reservoir. [IMC 506.3.7]

5. Grease ducts:

    A. Must be constructed of steel not less than 0.055 inch (No. 16 Gage) in thickness or stainless steel not less than 0.044 inch (No. 18 Gage) in thickness (see Exception for listed grease duct). [IMC 506.3.1.1]
    B. All seams, joints, and penetrations must have *liquid tight external welds*. [IMC 506.3.2]
    C. Ducts exposed to the outside atmosphere must be protected against corrosion in an approved manner. [IMC 506.2]
    D. A separate grease duct system must be provided for each hood (see Exceptions). [IMC 506.3.5]

6. Any portion of grease duct having sections not provided with access from the duct entry or discharge must be provided with cleanout openings. [IMC 506.3.8 and 506.3.9] Show locations.

7. A grease duct penetration through a fire-resistance rated ceiling, wall, or floor must be protected by fire-resistance rated shaft construction. Minimum clearances must be maintained between the grease duct and shaft enclosure. [IMC 506.3.10] Fire-resistance rated access openings through the rated shaft must be provided at grease duct cleanouts. [IMC 506.3.11]